U.S. Department of Transportation
Federal Highway Administration

# Weather Delay Costs to Trucking

Road Weather Management Program Stakeholder Meeting
Madison, WI
August 8, 2012


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FREIGHT TRANSPORTATION RESEARCH ASSOCIATES
FTR ASSOCIATES

# Background

- Commercial vehicles main mode of freight transportation
  - $500 billion freight sector
  - 70% of total value and 60% of weight moves by truck
  - Estimates that adverse weather is responsible for 12% to 25% of all delay
  - Trucking delays due to weather = $3.1 billion/yr for the 50 largest cities
  - Lost commerce due to snow closures = $10 billion/day
- Other economic impacts of adverse weather
  - More than $2 billion/yr is spent on snow and ice control by State DOTs
  - Weather accounts for 25% of non-recurring congestion

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# Project Objective

- **Quantify the Impact of Adverse Weather on U.S. Roadway Freight Operations**
  - **Key Questions**
    - **What is the overall level of delay in the system?**
    - **What portion of delay is incurred by CVs?**
    - **What portion of delay is caused by adverse weather?**
    - **What is the value of commercial shipments?**
  - **Various data sources available**
  - **Important to select the realistic level of detail**

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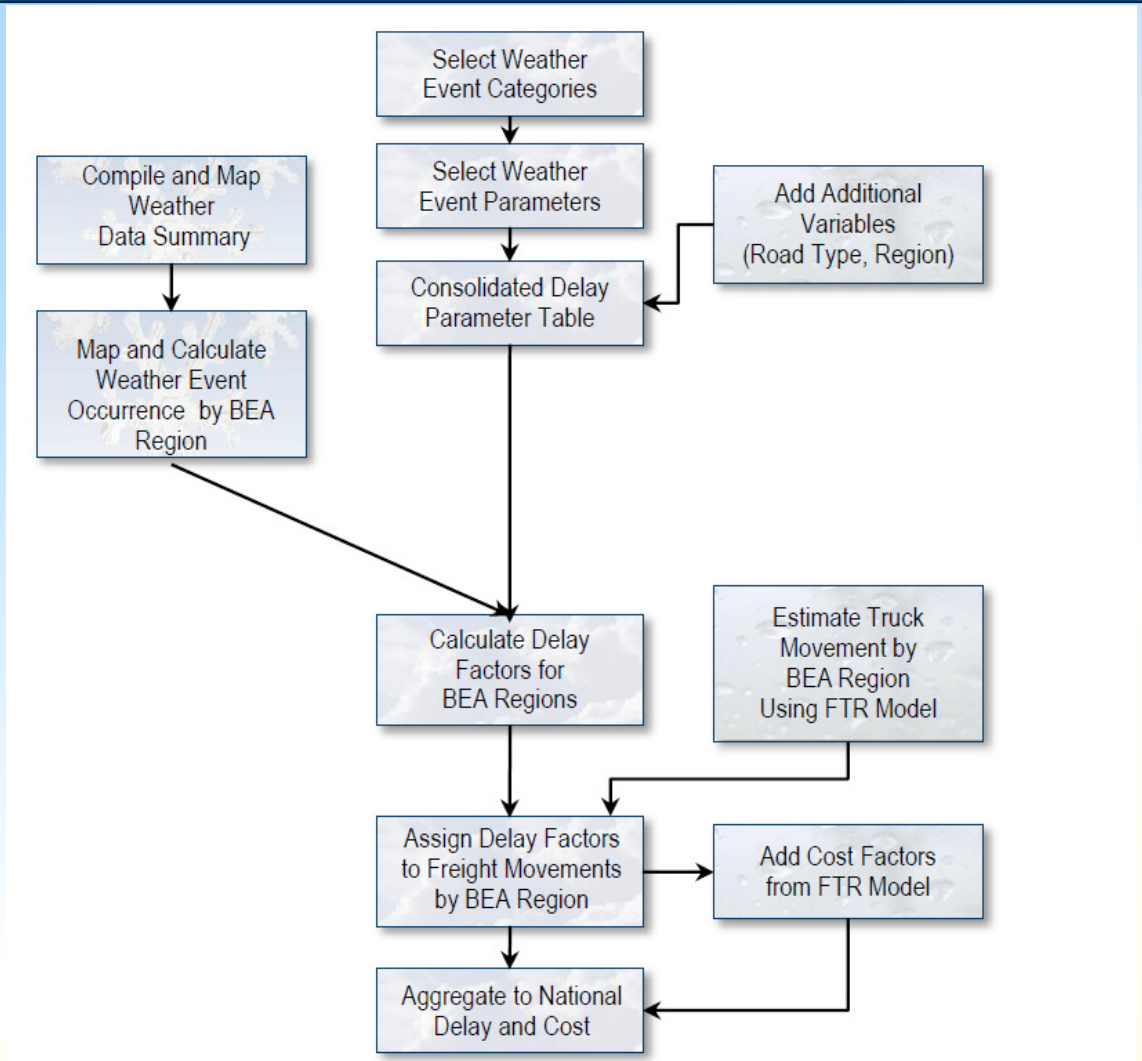
# Work Plan

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# Freight Performance Data – Source

- Average truck speeds, 2008 to 2010
- FPMweb Tool
  - Initiative of FHWA Office of Freight Management and Operations, in partnership with the American Transportation Research Institute (ATRI)
  - Derived from GPS trucking data
    - Trucks that travel on interstate highways
    - Several hundred thousand trucks
    - Billions of truck data position points

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# Weather Data – Source

- Global Summary of the Day (GSOD)
- Department of Commerce (DOC), National Oceanic and Atmospheric Administration (NOAA), National Environmental Satellite, Data, and Information Service (NESDIS), National Climatic Data Center (NCDC)
- FTP Access (Free, Public)
  - Data available by station by year
  - 2008, 2009, 2010

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# Weather Data – GSOD

- **Data on:**
  - **Mean temperature (.1 Fahrenheit)**
  - **Mean dew point (.1 Fahrenheit)**
  - **Mean sea level pressure (.1 mb)**
  - **Mean station pressure (.1 mb)**
  - **Mean visibility (.1 miles)**
  - **Mean wind speed (.1 knots)**
  - **Max sustained wind speed (.1 knots)**
  - **Maximum wind gust (.1 knots)**
  - **Max temperature (.1 Fahrenheit)**
  - **Minimum temperature (.1 Fahrenheit)**
  - **Precipitation amount (.01 inches)**
  - **Snow depth (.1 inches)**

**Indicator for occurrence of:**

- Fog
- Rain or Drizzle
- Snow or Ice Pellets
- Hail
- Thunder
- Tornado/Funnel Cloud

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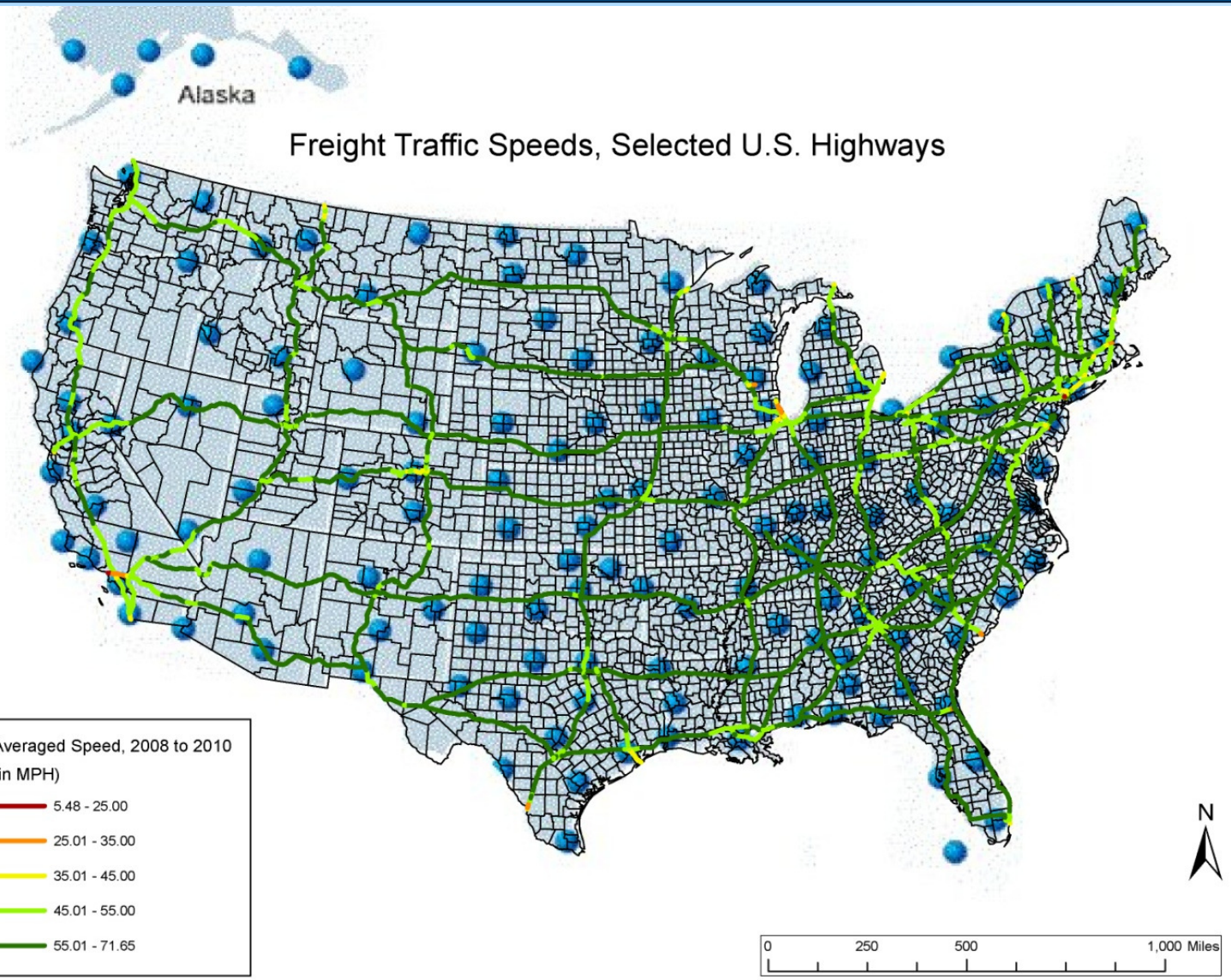
# Weather Data – GSOD




These stations were selected because they overlaid the truck speed data very well

# Weather and Transport Modeling Work

- The performance modeling has three phases
  - Weather effects on highway performance
  - Delays and other operating effects on trucking
  - Cost, service and other economic effects on supply chains

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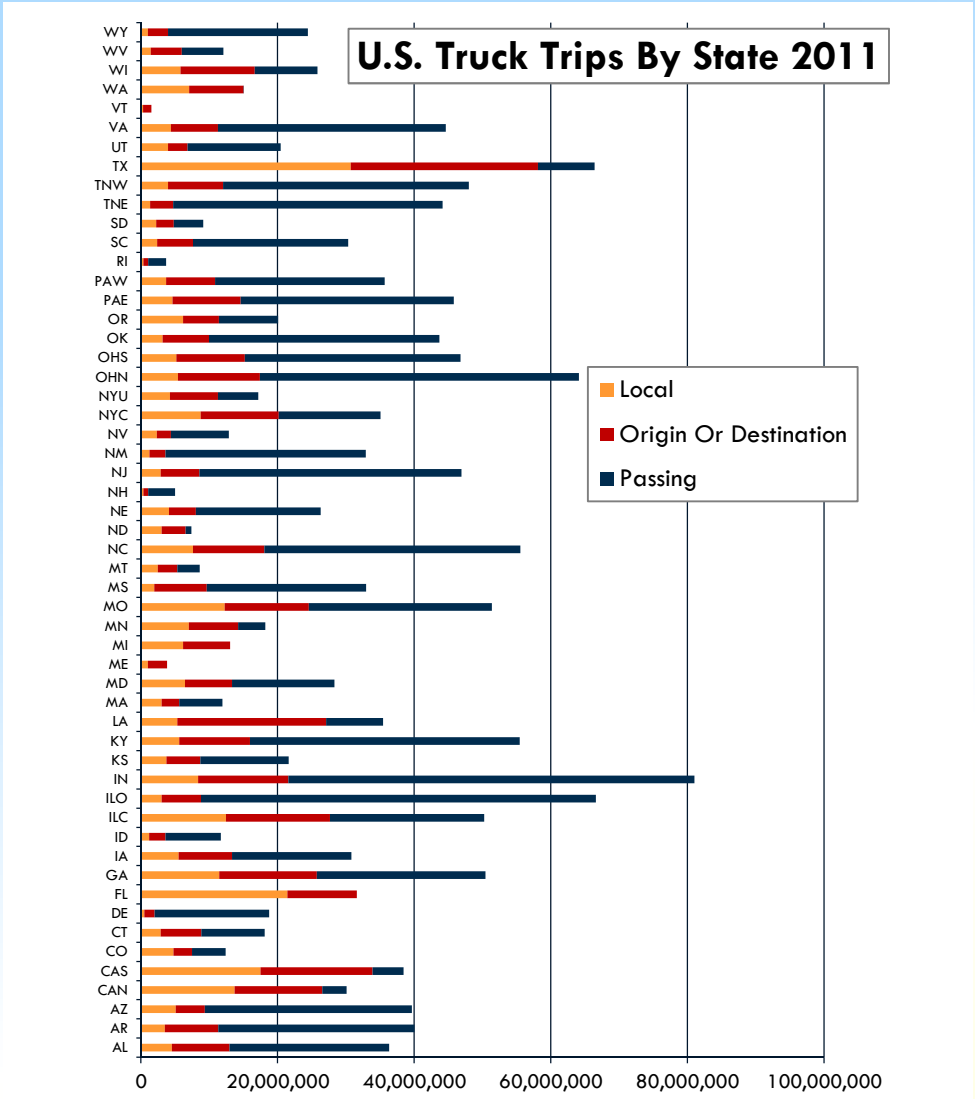
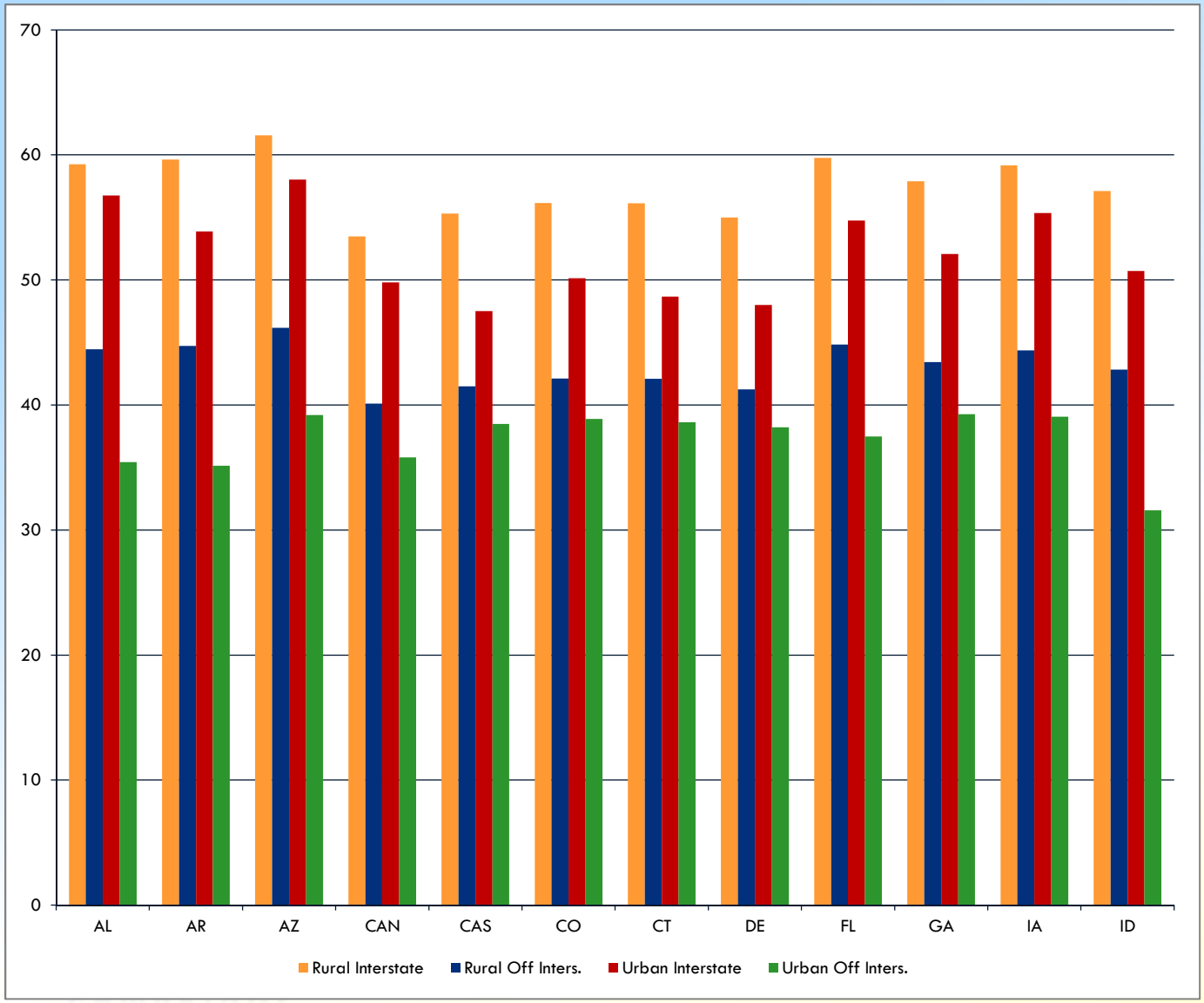
# Highway Network: Trucking Analysis Complete




- Substantially advances our understanding of trucking work.
- It reveals that almost half (47%) of trucking activity in the states is transient.
- The activity is largely unreported by conventional statistics that track origin and destination activity but have little detail on what happens in between.

# Highway Performance Data: Baseline Speeds




This chart shows baseline speeds from which to calculate weather degradations

# Background

- Initial estimate of annual weather-related freight delay is $8.66/year billion per year
- Weather impacts distributed more evenly across country than may be thought – many small events impact travel speed
- Many unanswered questions due to:
  - Need for national, broad brush approach
  - Mismatch between high level of weather data detail and lower level of freight movement detail
  - Need for many assumptions on both sets of data
- Detailed subarea studies considered as way to validate model and improve confidence

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# Questions or Comments